General Pharmacological Principles

Obtaining Medical Information

- Patient is best source
- Bottles
- Refrigerator
- Family members
- Home health

Questions to Ask

- Meds prescribed by a physician?
- Why?
- When?
- Compliance vs. Non-compliance
- Over the counter
- Herbals

General Principles

- Drug
  - chemical compound
- Pharmacology
  - study of drugs

Sources of Drugs

- Plants
  - morphine
  - digitalis
- Animals
  - insulin
- Mineral
  - sodium bicarbonate
- Synthetic Chemicals

Drug Classification

- Pharmacological Classes
  - name
  - function
- Legal Classification
  - prescription
  - OTC
  - Orphan drugs

Drug Information Resources

- References
  - US Pharmacopoeia Dispensing Information
  - Physician's Desk Reference
  - Handbook of Non-prescription drugs
  - American Hospital Formulary Service
- Pharmacist
- Drug Information Centers
- Professional Journals
- Internet/TV

Routes of Administration

- Oral (PO)
  - tablets
  - capsules
  - liquids
  - suspensions
  - elixirs
  - syrups
  - tinctures

Routes of Administration

- Sublingual (SL)
- Buccal (cheek)
- Topical
  - creams
  - ointments
  - patches (NTG)
- Drug Instillation
  - eye drops
- Inhalation

Routes of Administration

- Parenteral
  - Intravenous (IV)
  - Intramuscular (IM)
  - Intradermal (ID)
  - Subcutaneous (SQ)
  - Epidural
- Rectal
  - suppositories
  - enemas
- Nasal
  - drops
  - inhalation

5 Rights

- Patient
- Drug
- Route
- Dose
- Time

Pharmacokinetics

- Number of drug molecules determines intensity
- Related to dose of drug
- 4 Processes
  - absorption
  - distribution
  - metabolism
  - excretion

Absorption

- Drug moves from administration to blood stream
- GI Tract Affected by
  - drug solubility (water; fats)
  - drug ionization
  - pH
  - stability
  - blood flow
  - motility

Absorption

- SQ or IM affected by:
  - pH
  - properties of drug
  - blood flow
- Other sites
  - mucosal surfaces
  - skin
  - transdermal

Absorption

- Parenteral
  - no absorption process

Distribution

- Process where drug is delivered to sites of action
- Barriers
  - blood-brain barrier
  - placental barrier
- Sites of accumulation
  - fat
  - bone and teeth
  - kidney

Metabolism

- Process where amount of drug is reduced
- Liver is main site
- Other sites
  - kidneys
  - lungs
  - blood
  - GI mucosa

Metabolism

- Other factors
  - age
  - nutrition
  - genetics
  - diseases
  - other drugs

Excretion

- Process of eliminating drug from body
- Occurs through glomerular filtration and tubular secretion in kidneys
- Other sites
  - GI tracts
  - lungs

Single-Dose Kinetics

- Onset of action
  - time between administration and effects
- Half-life
  - time for plasma concentration to fall to 50% of previous concentration
  - same regardless of administration route
  - can be affected by disease state

Single-Dose Kinetics

- Half-life exception
  - some drugs have elimination pathway that can be saturated (at higher blood levels)
  - rate of elimination is the same regardless of amount of drug in blood
  - called rate-limited elimination
  - ETOH and ASA

Multiple Dose Kinetics

- A drug given repeatedly at same dose will reach plateau
  - steady state
  - takes 4-5 half-lives
  - drugs administered each half-life
  - half-life helps determine dosing interval

Other Dosing Situations

- Loading dose
  - need effective blood concentration immediately
  - followed by maintenance doses
- IV infusion
  - drug administered at constant rate

Mathematical Equations

- Used to figure appropriate doses, administration schedules, and dosing changes

Pharmacodynamics

- Study of how drugs exert their effects
- Agonists
  - bind to receptor and alter function
    - affinity: drug binds to receptor site; reversible
    - efficacy: ability to cause a response
  - endogenous and exogenous

Pharmacodynamics

- Antagonists
  - receptor blockers
  - interact with receptor, but no response
  - show affinity, but no efficacy
- Specificity of drug-receptor interactions
  - interact with 1 receptor or several

Pharmacodynamics

- Potency
  - dose needed to produce response
  - not the same as efficacy
- Efficacy vs. Safety

Adverse Drug Effects

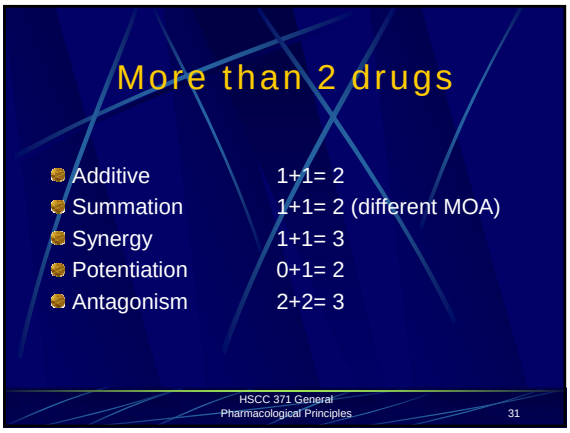
- These are side effects of drugs
- Contraindications
  - factors predisposing patient to adverse effects
  - absolute vs. relative

Adverse Drug Effects

- Factors related to adverse effects
  - patient factors
    - diet
    - compliance
    - disease states
    - misunderstanding of directions
  - Iatrogenic
    - errors

Adverse Drug Effects

- Factors related to adverse effects
  - pharmacological
    - allergies
    - cumulative effects
    - toxicity
    - tolerance
    - dependence
    - more than one drug
- Multiple drug therapies


More than 2 drugs
Additive 1+1= 2
Summation 1+1= 2 (different MOA)
Synergy 1+1= 3
Potentiation 0+1= 2
Antagonism 2+2= 3
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